

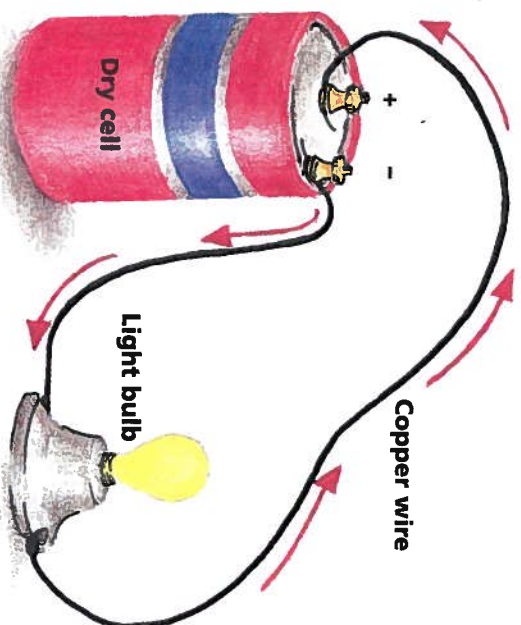
10-2 What are insulators and conductors?

Objective ▶ List some examples of conductors and insulators.

TechTerms

- ▶ **conductors:** materials that allow electric charges to flow through them easily
- ▶ **insulators:** materials that prevent electric charges from flowing through them easily

Conductors A material that allows electric charges to flow through it is called a **conductor**. If a metal wire is placed between two oppositely charged objects, electrons will flow through the wire toward the positively charged object. Many metals are good conductors. Suppose a metal wire is attached to the positive and negative poles of a battery. Electrons will flow toward the positive pole. If a piece of rubber is used instead of a metal wire, electrons will not flow.



All conductors allow electrons to flow, but some conductors are better than others. A wire made of copper or iron is one of the best conductors of electricity. A wire made of brass or magnesium is not as good a conductor of electricity.

► **Define:** What is a conductor?

Insulators A material that prevents electric charges from flowing through it is called an **insulator**. Rubber is an insulator. When a piece of rubber is placed between two charged objects, electrons will not flow. The piece of rubber keeps the electrons from flowing. Other insulators are cork, wood, and plastic.

► **Classify:** Is a piece of rubber an insulator or a conductor?

Insulated Wires Electric wires use both insulators and conductors. The conductor is most often made of copper. The copper wire is then covered with an insulator such as rubber. The rubber prevents electricity from leaking out of the bare wire. Very old electric cords may have the rubber insulation worn out. These electric cords are dangerous because they can cause a short circuit. A short circuit results when two wires touch, allowing an electric charge to jump between them.



► **Explain:** Why are electric cords covered with rubber?

LESSON SUMMARY

- ▶ A conductor allows electric charges to flow easily.
- ▶ Some conductors are better than others.
- ▶ An insulator prevents electric charges from flowing easily.
- ▶ An electric cord is made up of a conductor and an insulator.

CHECK Complete the following.

1. A _____ allows current to flow easily.
2. Rubber is a(n) _____ because it prevents current from flowing easily.
3. In an insulated electric wire, the _____ is the conductor.
4. An electric cord is safe to touch because it is covered with _____.
5. If the two wires in an electric cord touch, a _____ will result.
6. Cork is a good _____.
7. A copper wire is one of the best _____.

APPLY Complete the following.

8. **Infer:** A lightning rod is supposed to keep a bolt of lightning from damaging a house. The rod is placed at the top of the house and is connected to the ground. Is the lightning rod made of a material that is a conductor or an insulator? Explain.

InfoSearch

Read the passage. Ask two questions about the topic that you cannot answer from the information in the passage.

Michael Faraday Faraday was a British scientist. He contributed a great deal to the understanding of electricity. Faraday was the first to discover the principle behind the electric motor. He also studied the relationship between electricity and magnetism. The faraday is a unit of electricity that was named in honor of Michael Faraday.

SEARCH: Use library references to find answers to your questions.

CAREER IN PHYSICAL SCIENCE

TELEVISION REPAIRPERSON

More than 90% of the homes in the United States have at least one television. A television is an electronic device. A television repairperson must be familiar with electronics. Electronics is the study of electricity as it is used in helpful devices such as televisions.

Televisions use semiconductors. One type of semiconductor is similar to an ordinary conductor. It allows electric charges to flow. The difference is that this semiconductor allows electric charges to flow in only one direction. Complicated electronic devices, including televisions, can be built using semiconductors.

Modern televisions use some of the same equipment found in computers. Some televisions even have small computers built into them.

Do you think you might want to be a TV repairperson? Visit a technical school to find out more about this career.

